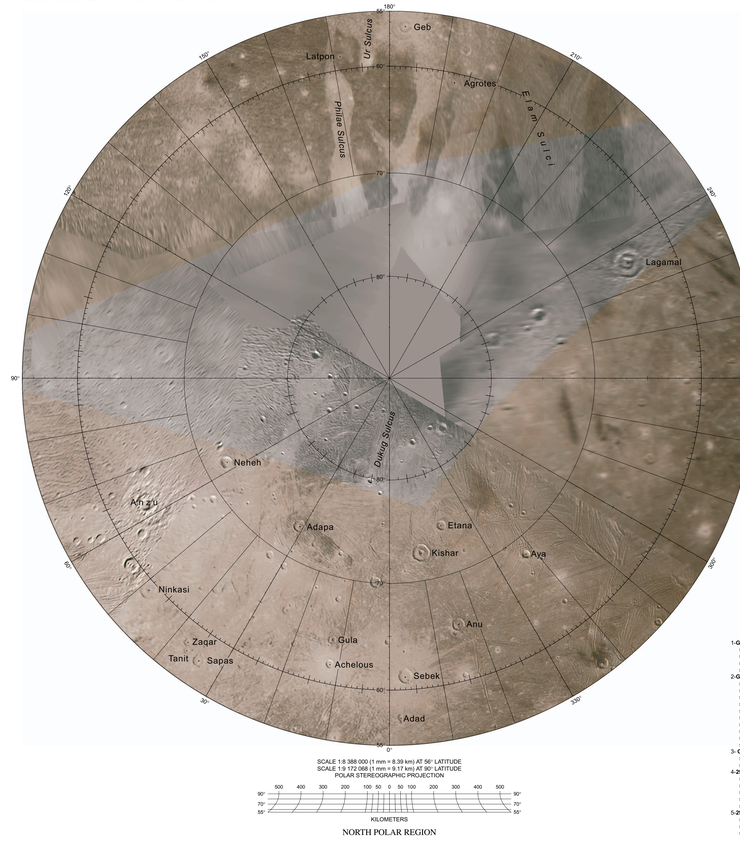
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared for the
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

GEOLOGIC INVESTIGATIONS SERIES I–2762
ATLAS OF JOVIAN SATELLITES: GANYMEDE



SCALE 1:8 388 000 (1 mm = 8.39 km) AT 56° LATITUDE
SCALE 1:9 172 068 (1 mm = 9.17 km) AT 90° LATITUDE
POLAR STEREOGRAPHIC PROJECTION

KILOMETERS

NORTH POLAR REGION

NOTES ON BASE

This sheet is one in a series of maps of the Galilean satellites of Jupiter at a nominal scale of 1:15,000,000. This series is based on data from the Galileo Orbiter Solid-State Imaging (SSI) camera and the Voyager 1 and 2 spacecraft.

PROJECTION

Mercator and Polar Stereographic projections used for this map of Ganymede are based on a sphere having a radius of 2632.345 km. The scale is 1:8,388,000 at ±56° latitude for both projections. Longitude increases to the west in accordance with the International Astronomical Union (1971) (Davies and others, 1996). Latitude is planetographic.

CONTROL

The geometric control network was computed at the RAND Corporation (Davies and others, 1998; Davies and Katayama, 1983). (This map of Ganymede utilized RAND's most recent solution as of November 1999). This process involved selecting control points on the individual images, making pixel measurements of their locations, using rescan locations to correct for geometric distortions, and converting the measurements to millimeters in the focal plane. These data are combined with the camera focal lengths and navigation solutions as input to photogrammetric triangulation software that solves for the best-fit sphere, the coordinates of the control points, the three orientation angles of the camera at each exposure (right ascension, declination, and twist), and an angle (W_0) which defines the orientation of Ganymede in space. W_0—in this solution 44.064°—is the angle along the equator to the east, between the 0° meridian and the equator's intersection with the celestial equator at the standard epoch J2000.0. This solution places the crater Anat at its defined longitude of 128° (Davies and others, 1996).

MAPPING TECHNIQUE

This global map base uses the best image quality and moderate resolution coverage supplied by Galileo SSI and Voyager 1 and 2 (Batson, 1987; Becker and others, 1998; Becker and others, 1999; Becker and others, 2001). The monochrome and color data were both processed using Integrated Software for Imagers and Spectrometers (ISIS) (Eliason, 1997; Gaddis and others, 1997; Torson and Becker, 1997). The individual images were radiometrically calibrated and photometrically normalized using a Lunar-Lambert function with empirically derived values (McEwen, 1991; Kirk and others, 2000). A linear correction based on the statistics of all overlapping areas was then applied to minimize image brightness variations. The image data were selected on the basis of overall image quality, reasonable original input resolution (from 20 km/pixel for gap fill to as much as 180 m/pixel), and availability of moderate emission/incidence angles for topography and albedo. The black and white monochrome base mosaic was constructed separately from the three-band color mosaic. Although consistency was achieved where possible, different filters were included for the monochrome global image coverage as necessary: clear for Voyager 1 and 2; clear, near-IR (757 nm), and green (559 nm) for Galileo SSI. Individual images were projected to a Sinusoidal Equal-Area projection at an image resolution of 1.0 km/pixel. The global color map was processed in Sinusoidal projection with an image resolution of 6.0 km/pixel. The color utilized the SSI filters 1-micron (991 nm) wavelength for red, SSI 559 nm for green, and SSI 413 nm for violet. Where SSI color coverage was lacking in the longitude range of 210°–250°, Voyager 2 wide-angle images were included to complete the global coverage. The chosen filters for the Voyager 2 data were ~530 nm for green, and ~480–500 nm for blue. The red band was synthesized in this area based on statistics calculated from the surrounding SSI 1-micron (991 nm) data and SSI and Voyager data in the green and blue bands. The final global color map was then scaled up to 1.0 km/pixel and merged with the monochrome base mosaic. The north pole and south pole regions that lack digital color coverage have been completed with the monochrome map coverage. The final constructed Sinusoidal projection mosaic was then reprojected to the Mercator and Polar Stereographic projections included on this sheet. The color of the final mosaic was enhanced using commercial software.

NOMENCLATURE

Names on this sheet are approved by the International Astronomical Union (IAU; 1980, 1986, 1999, and 2001). Names have been applied for features clearly visible at the scale of this map; for a complete list of nomenclature for Ganymede, please see http://planetarynames.wr.usgs.gov.

Jg 15M CMNK: Abbreviation for Jupiter, Ganymede (satellite); 1:15,000,000 series; controlled mosaic (CM), nomenclature (N), color (K) (Greeley and Batson, 1990).

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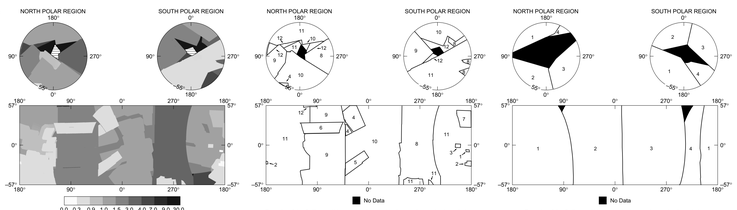

Index showing approximate resolution of black and white images included in the mosaic

Footprint of the Galileo and Voyager black and white image observation boundaries

Footprint of the Galileo and Voyager color image observation boundaries

1-**G8GSMELKRT01**
s0394532265
s0394532266
s0394532278
s0394532279
2-**G8GSCALDRA01**
s0394532413
s0394532426
s0394532427
s0394532439
s0394532440
s0394532452
s0394532453
s0394532465
s0394532466
s0394532478
3- **G8GSTIAMAT01**
s0394538200
s0394538201
4-**29GSCAPGDL01**
s0584060500
s0584060800
s0584061100
s0584061400
s0584061700
5-**29GSDARDAN01**
s0584062000
s0584062102
s0584062101
s0584062100
s0584062201
s0584062200
6- **C9GSSULCUS01**
s0401668800
s0401668913
s0401668826
s0401668839
7- **G8GSBEECDAN01**
s0394537800
8- **E6GSGLOBAL02**
s0383881501
s0383881514
s0383881500
s0383881513
9- **C9GSGLOBAL01**
s0401701500
s0401701013
s0401701026
s0401701039
s0401701052
s0401701065
s0401701078
10- Voyager 1
c1640132
c1640142
c1640152
c1640222
c1640212
c1640202
c1640232
c1640242
c1640302
c1640312
c1640322
c1640354
c1640334
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c1640504
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c1640518
c1640520
c1640528
c1640530
c1640542
c1640546
c1640550
c1640556
c1640548
c1640606
11- Voyager 2
c2063912
c2063109
c2063111
c2063119
c2063127
c2063129
c2063321
c2063525
c2063529
c2063537
c2063541
c2063545
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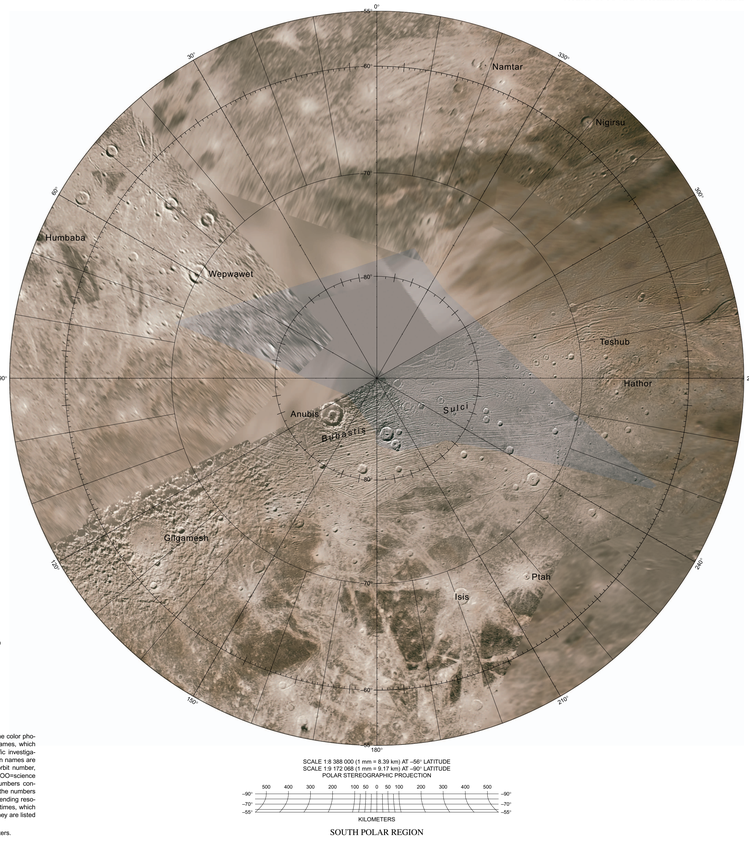
c2064025
c2064027
c2064037
c2064039
c2064041
c2064043
c2064047
c2064053
c2064051
c2064051
12-Low resolution
G1GSGLOBAL01
s0349632000
14GSGLOBAL01
s0441013076
20GSGEOGAP01
s0498116900
19GSGLOBCOL01
s0413627200
Voyager 1
c1628912
c2058308
Voyager 1
c1628936

Listed at left are the images that were used to create the black and white photomosaic. Bold entries represent Galileo observation names, which are areas of Ganymede that were targeted for scientific investigation. The numbers and letters included in the observation names are in a standard format (NNTIOOOOOOSS) where NN=orbit number, T=target (Ganymede in this case), I=instrument, OOOOOO=science targeting objective, and SS=sequence number. The numbers connected with these bold observation names correlate to the numbers on the index above center and are listed in order of descending resolution. The 's' and 'c' entries represent spacecraft clock times, which are used as unique archival identifiers for each image; they are listed in the order they were mosaicked.

1– **G1GSGLOBAL01**–6km/pixel image resolution
s0349632100 413 nm—violet
s0349632200 559 nm—green
s0349632145 991 nm—red
2– **10GSGLOBAL01**–17 km/pixel image resolution
s0413627145 413 nm—violet
s0413627100 559 nm—green
s0413627245 991 nm—red
3– **14GSGLOBAL01**–9 km/pixel image resolution
s0441013145 413 nm—violet
s0441013146 413 nm—violet
s0441013078 559 nm—green
s0441013168 991 nm—red
s0441013169 991 nm—red
4– Voyager 2
c2063531 ~530 nm—green, 9.9 km/pixel
c2063539 ~480–500 nm—blue, 9.7 km/pixel

Listed above are the images that were used to create the color photomosaic. Bold entries represent Galileo observation names, which are areas of Ganymede that were targeted for scientific investigation. The numbers and letters included in the observation names are in a standard format (NNTIOOOOOOSS) where NN=orbit number, T=target (Ganymede in this case), I=instrument, OOOOOO=science targeting objective, and SS=sequence number. The numbers connected with these bold observation names correlate to the numbers on the index above right and are listed in order of descending resolution. The 's' and 'c' entries represent spacecraft clock times, which are used as unique archival identifiers for each image; they are listed in the order they were mosaicked.

The arbitrary 'nnn' represents wavelength in nanometers.

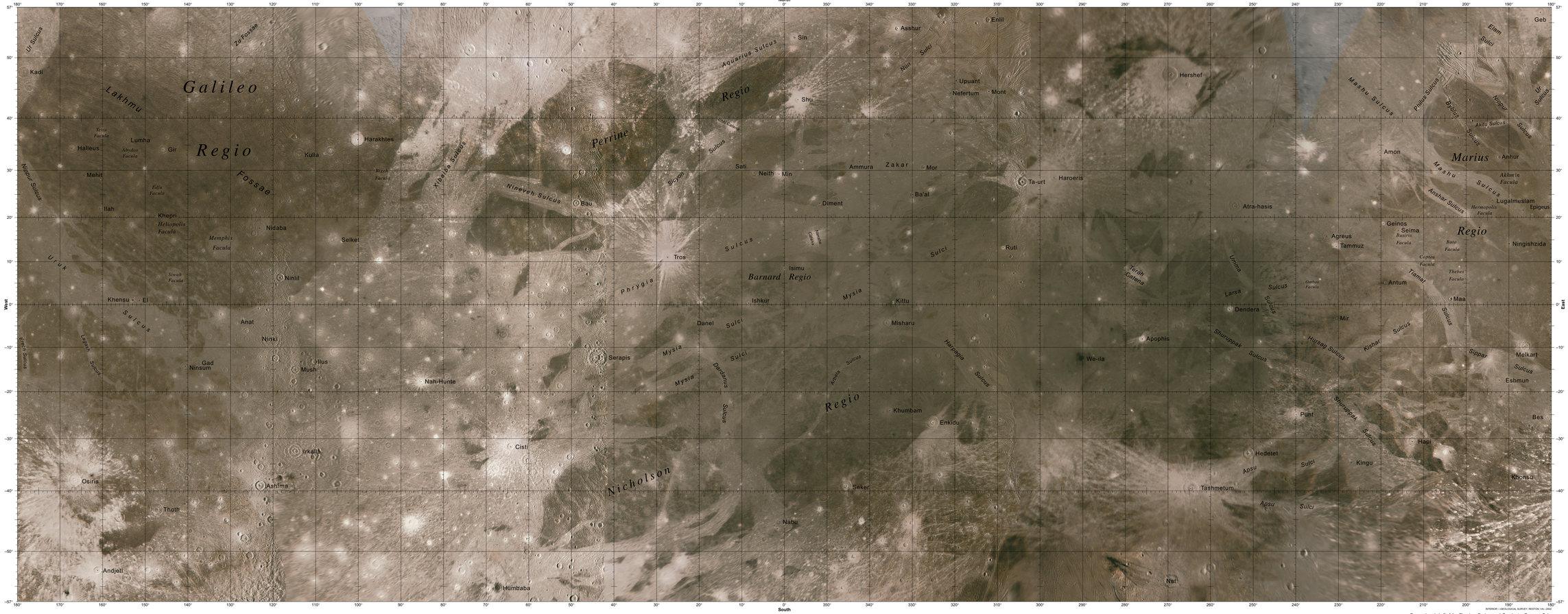


SCALE 1:8 388 000 (1 mm = 8.39 km) AT -56° LATITUDE
SCALE 1:9 172 068 (1 mm = 9.17 km) AT -90° LATITUDE
POLAR STEREOGRAPHIC PROJECTION

KILOMETERS

SOUTH POLAR REGION

North



SCALE 1:15 000 000 (1 mm = 15 km) AT 0° LATITUDE
MERCATOR PROJECTION

KILOMETERS

CONTROLLED COLOR PHOTOMOSAIC MAP OF GANYMEDE

Jg 15M CMNK

2002

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NOTE TO USERS

Users noting errors or omissions are urged to indicate them on the map and to forward it to the Astrogeology Team, U.S. Geological Survey, 2255 North Gemini Drive, Flagstaff, Arizona 86001. A replacement copy will be returned.

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